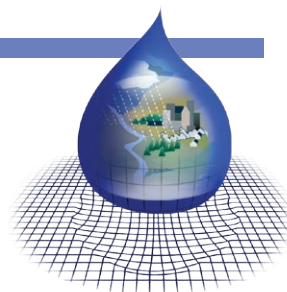


Watershed Characterization System (WCS)



An important initial phase of Total Maximum Daily Load (TMDL) development is the characterization of the watershed that drains into the impaired waterbody. This involves the following activities:

- Characterization of the physical and hydrologic properties of the watershed, such as soil, land use, elevation, climate, and streamflow.
- Evaluation of ambient water quality conditions, including inventory of monitoring stations and statistical analysis of observed data.
- Assessment of potential sources of impairment, such as permitted dischargers, crop and livestock agriculture, mining, silviculture, and populated places, and preliminary estimation of pollutant loads from these sources.

The U.S. Environmental Protection Agency (EPA) Region 4, has developed the Watershed Characterization System (WCS), a state-of-the-art tool to assist the process of characterizing watersheds. WCS is a version of EPA's BASINS system customized for EPA Region 4. WCS provides users an initial set of watershed data along with analysis and reporting tools to process the data. The system can be applied to a broad range of TMDLs since the characterization process is relatively uniform and can be standardized regardless of the waterbody type and pollutant. WCS version 2.0 can be downloaded from <http://wcs.tetrattech-ffx.com> and is currently available for the states in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee).

WCS Database

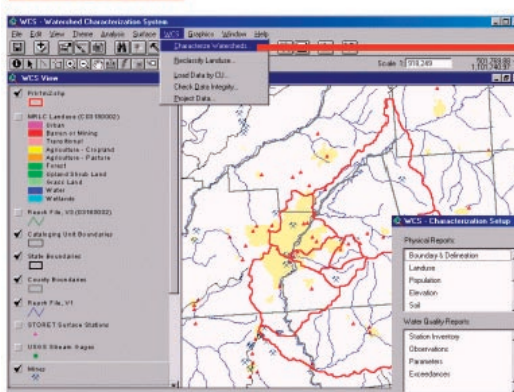
The WCS database is a compilation of environmental from a variety of sources in ArcView shape and ta file format. The data can be grouped into three major categories—base cartography, environmental background environmental monitoring data. The base cartography such as watershed boundaries, political and administrative boundaries, roads, and other infrastructures, can be used to define the area of interest and serve as a locational reference for mapping purposes. The environmental background such as land use and soil data, may reflect the vulnerability of the area to pollution. The environmental monitoring can indicate current and historical water quality conditions in response to environmental pressures. The WCS data

preprocessed and included in a consistent format in WCS. They were taken from nationally compiled databases of EPA, U.S. Geological Survey (USGS), U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS), U.S. Bureau of the Census, and National Oceanic and Atmospheric Administration (NOAA). State and locally available data were included in WCS during the further customizations for Georgia and Tennessee.

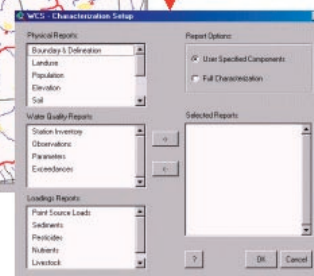
Automated Reports

WCS not only provides tools for analyzing watershed data but also automatically creates report tables and maps in Microsoft Word as a result of the analysis. This feature significantly speeds up watershed characterization (and therefore TMDL development) because it eliminates the time-consuming and

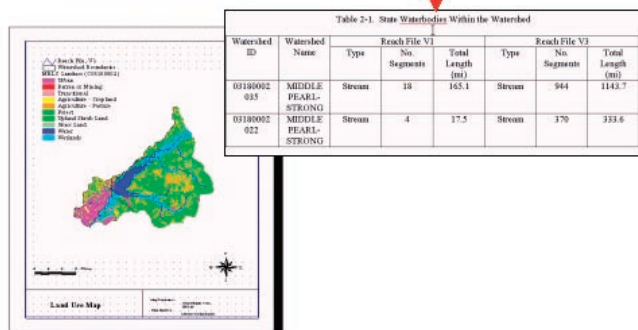
Core System



Automated reports



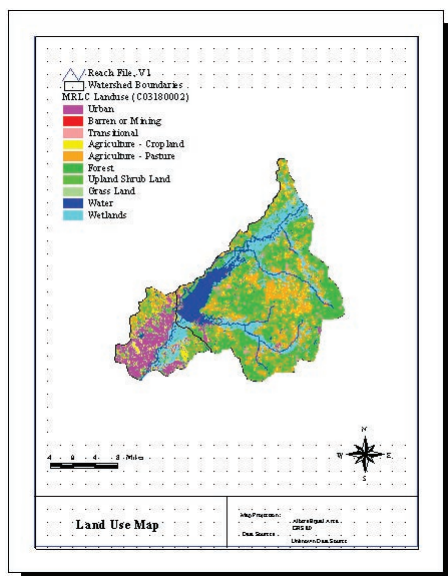
Maps and Tables



tedious compilation and formatting of information usually required for preparing watershed characterization reports.

Watershed Delineation

WCS contains manual and automatic watershed delineation tools to assist users in defining the extent of the area of interest. The user can delineate any number of subwatersheds within the USGS 8-digit watersheds provided with the system during distribution. As an alternative, the user can choose to import a watershed delineated outside WCS. The import tool can also be used to incorporate other data layers. This is particularly important when local data is available to replace the default data in WCS.



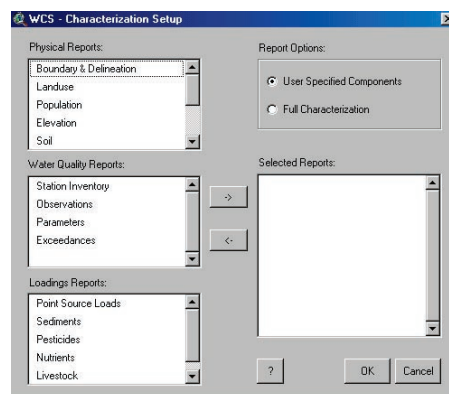
WCS Modeling Extensions

A suite of modeling extensions of WCS were developed to expand the system's use from solely a watershed characterization system into a framework for running specific models that can be used for TMDL development. The system can be used to automatically prepare input files for selected hydrologic and water quality models since it already contains watershed data that can be used to parameterize such models. These features are being provided as extensions since their use is highly dependent on the waterbody type and TMDL pollutant. Modeling extensions that were developed include a sediment budget model, a mercury loading model, an input preprocessor

for the Stormwater Management Model (SWMM) and the Loading Simulation Program in C++ (LSPC, a TMDL-focused version of HSPF).

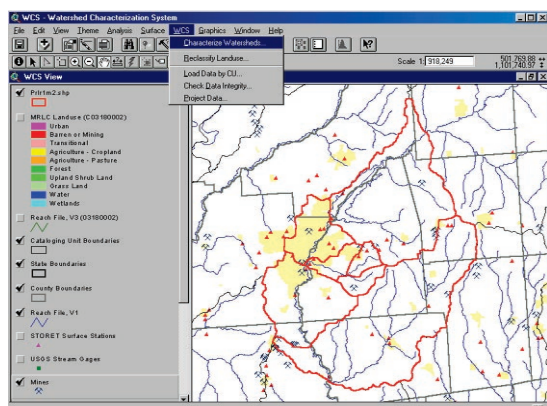
Other Potential Uses

The characterization of watersheds is important not only for TMDL development but also for basinwide planning and monitoring, nonpoint source programs, and waterbody assessments. Therefore, WCS can be used to prioritize watersheds for monitoring and intensive surveys, for nonpoint source assessments to identify target areas for BMP implementation and stakeholder education, and for impairment analysis and delisting of waterbodies.



Future Enhancements

The performance of WCS will improve as more recent and localized data are used. Additional import utilities for easy incorporation of local data into the system to replace or supplement default data sets will be provided as new data are identified. Short-term enhancements will include support for automated creation of HTML files for web posting and detailed instructions on how to import localized data and BASINS 3.0 data into the WCS framework. Long-term enhancements will include the expansion of WCS for other EPA Regions.



Visit the
Watershed & Water Quality Modeling
Technical Support Center Website
<http://www.epa.gov/athens/wwqtsc/index.html>